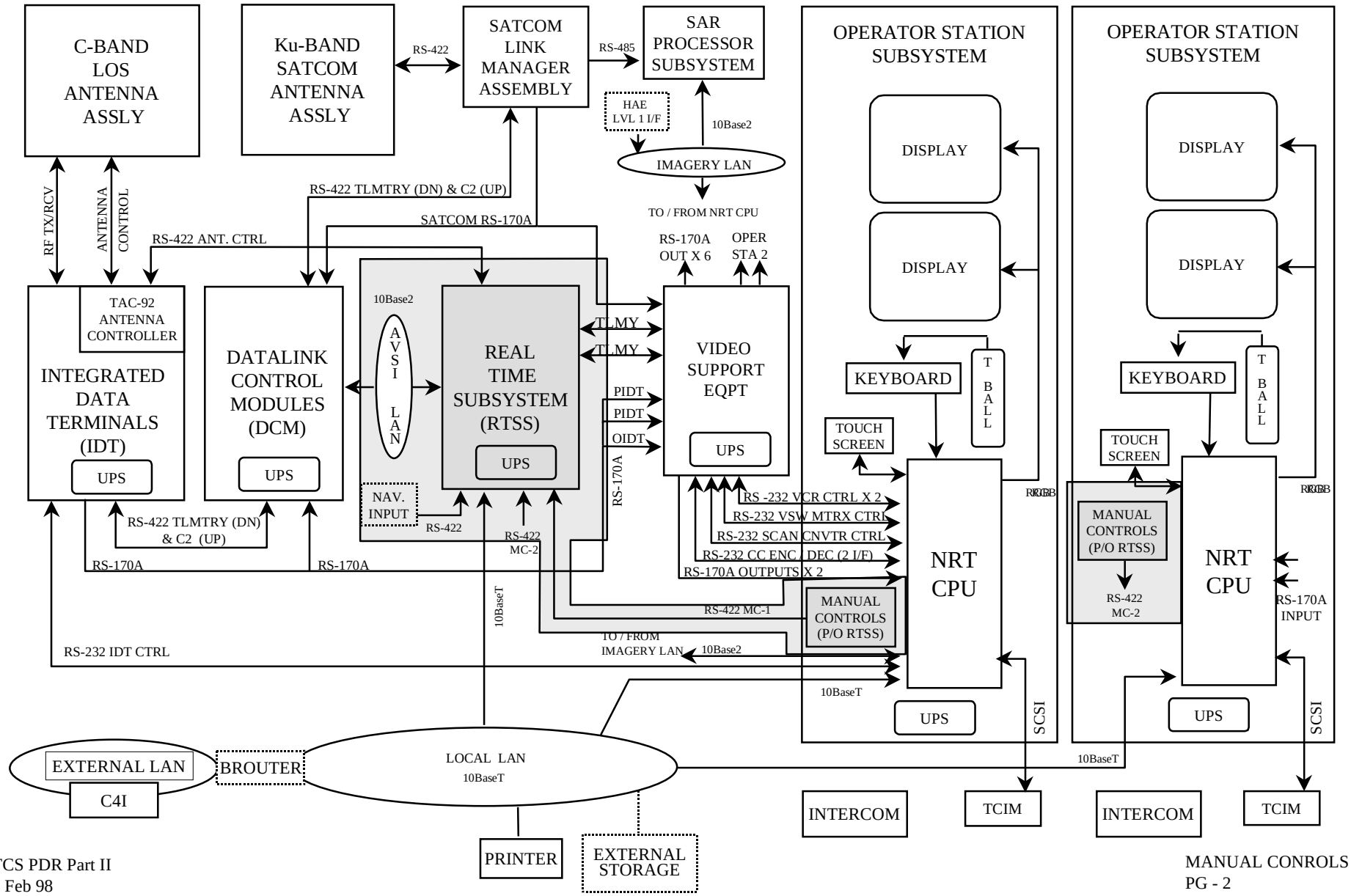
TCS MANUAL CONTROLS

REAL-TIME SUBSYSTEM



TCS SSDD MANUAL CONTROL REQUIREMENTS

SSDD001 The TCS shall transmit command and control information to the Air Vehicle (AV) via the uplink.

SSDD007 The TCS support equipment shall include the following: C4I Support Equipment HWCI, Communication Equipment HWCI, Intercom Equipment HWCI, External Storage HWCI, Printer HWCI, Datalink Terminal HWCIs, UCARS HWCI, Integrity Beacon Landing System (IBLS) HWCI, and Manual Controls HWCI.

SSDD008 In the selection of HWCIs to satisfy the requirements herein, Non-Developmental Items (NDI) (off-the-shelf equipment previously approved for service use) shall be chosen to the maximum practicable extent.

SSDD009 If NDI that provides the desired functions can not be identified, then Commercial-Off-The-Shelf (COTS) hardware shall be used.

SSDD010 The HWCIs of the TCS shall be capable of being scaled as well as being modular to meet the varying needs of the Services.

SSDD011 The TCS HWCIs shall be mounted as well as ruggedized to withstand inter and intra theater movement.

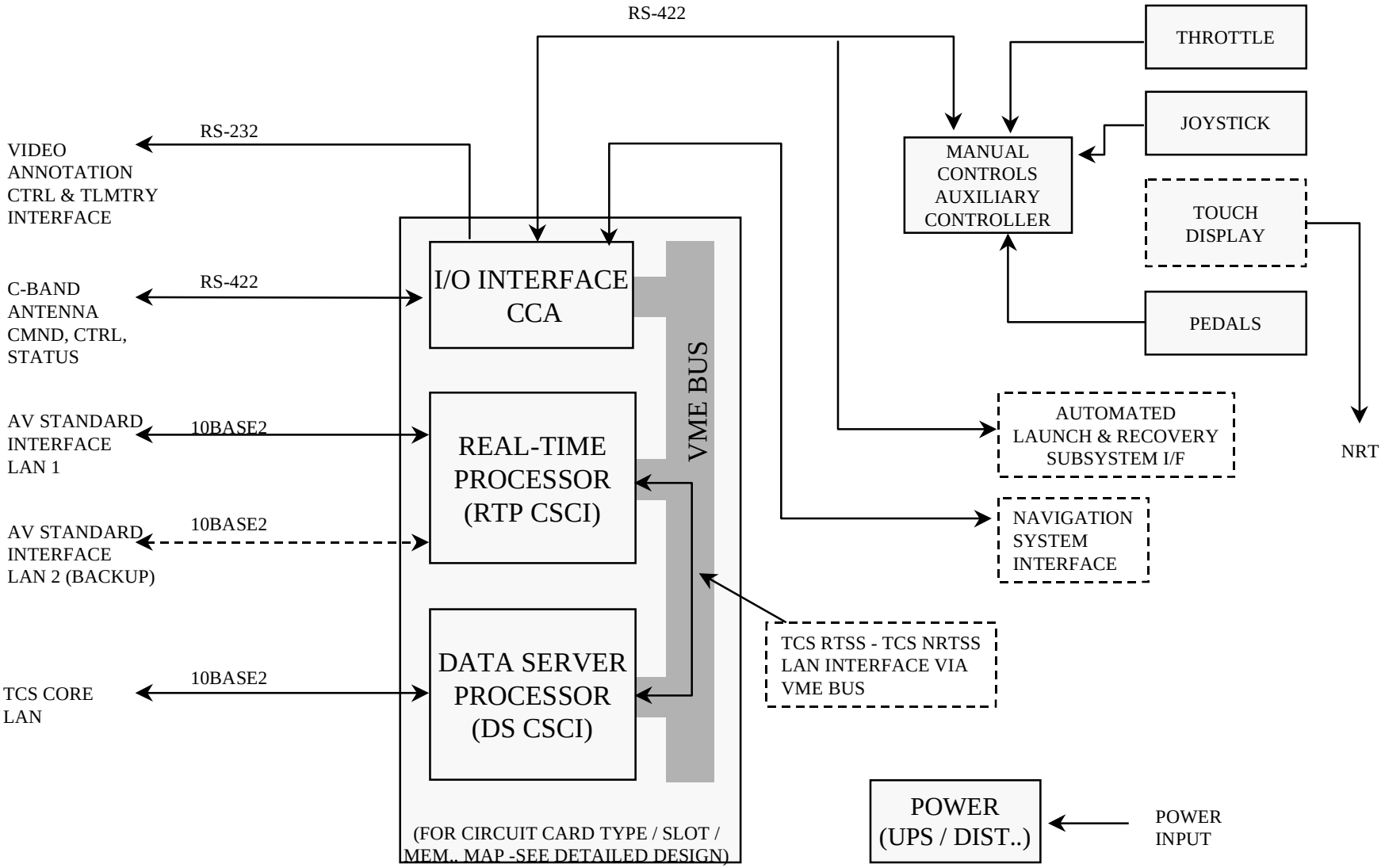
SSDD015 All hardware components (developed or selected to be used in the TCS design), to the extent possible, shall support the concepts of modularity, scaleability, and future growth.

SSDD132 The maximum size, weight, and power requirements for the Manual Controls HWCI shall not exceed the values shown in Table 4.2.3.1.2-1.

SSDD250 The Common UAV Control CSCI flight controls shall provide operator commanded control with over ride.

SSDD653 The TCS shall support 5 levels of UAV interaction

REAL-TIME SUBSYSTEM (RTSS)



MANUAL CONTROL COMPONENTS

- TCS Will utilize manual control components from Measurement Systems, Inc. (MSI).

- MSI products range from commercial off-the-shelf to custom, military grade products that are utilized by other military systems (such as the AN/UYQ-70 console).

- Current TCS manual control devices include: joystick, throttle, pedals, and touch screen.

- The goal of the selection of the manual controls is to select devices that offer a universal set of controls that meet the flight mode requirements of the various UAVs.

JOYSTICK COMPONENT

MSI Model 546 Joystick

- Gimbal type displacement joystick

- Dual axis (X, Y), return-to center

- Adjustable operation force via springs

- Customize with the addition of push button switch (MSI 701683 or 7010137) on side, and thumb wheel (MSI 682412)

JOYSTICK TECHNICAL DATA

Joystick Electrical Data

Potentiometers Resistance 5 K ohms +/- 10%

10mV Max Output at +/- 10 V DC Input

Interface

24 AWG Per MIL-W-16878/4, 22 AWG for Ground

Enclosure

4.5” (W) x 11.0" (H) x 4.5" (D)

Material: Anodized Aluminum Alloy, Stainless Steel, Sleeve Ball Bearings, Plastic Grip, and Neoprene Boot.

Weight: 3.5 lbs

Reliability

Potentiometers: 1,000,000 cycles; Switches: 200,000 cycles; Trigger: 100,000 cycles.

Environmental

Temperature

Operating: -25C to +85C

Storage: -55C to 125C

Humidity: 95%RH, Non-Condensing, Mil-Std-810C, Method 507, Procedure I

Vibration: Mil-Std-810C, Method 514.2, Procedure VIII

Mechanical Shock: MIL-STD 810C, Method 516.2 Procedure I.

INTERFACE MODULE COMPONENT

MSI Model 4303 Module

- Designed to receive inputs from variety of MSI controls

- Outputs signals in RS-422 or RS-232 serial data stream.

- Supports up to 7 analog (axis) inputs plus 24 switches.

- Transmits position data as absolute position information in an 8 bit number.

INTERFACE MODULE TECHNICAL DATA

Interface Module Electrical Data
+ 5V DC +/- 5% (RS-232C @ 250 mA, RS-422A @ 300mA)
Interface
Input: Cannon DB-25S Female Connector
Output: Cannon DB-25P Male Connector
Enclosure
3.5” (W) x 2.1" (H) x 3.5" (D)
Material: Anodized Aluminum Alloy
Weight: 1.5 lbs
Reliability: TBD

Environmental
Temperature
Operating: +10C to +50C
Storage: -55C to 125C
Vibration: Mil-Std-810C, Method 514.2, Procedure VIII
Mechanical Shock: MIL-STD 810C, Method 516.2 Procedure I.

THROTTLE COMPONENT

MSI Model 541 Throttle

- Generic Single Lever Throttle

- Lever Guide Plate for Critical Throttle Positions Marking

- Tailorable for Custom Configurations

- Customize with the addition of push button switches (MSI 701683 or 7010137), and thumb wheel (MSI 682412)

THROTTLE TECHNICAL DATA

Throttle Electrical Data

Potentiometers Resistance 5 K ohms +/- 10%

10mV Max Output at +/- 10 V DC Input

Interface

24 AWG Per MIL-W-16878/6, 22 AWG for Ground

Enclosure

4.25” (W) x 8.0" (H) x 6.5" (D)

Material: Anodized Aluminum Alloy, Stainless Steel, Plastic Grip, Neoprene Boot.

Weight: 3.0 lbs

Reliability

Potentiometers: 2,000,000 cycles; Switches: 200,000 cycles;

Environmental

Temperature

Operating: -25C to +85C

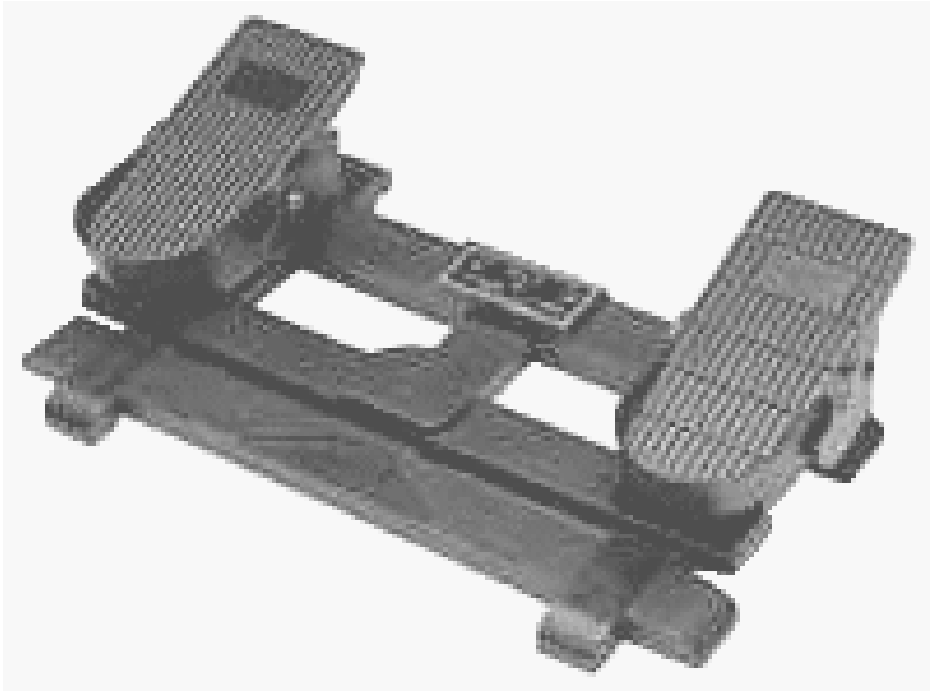
Storage: -55C to 125C

Humidity: 95%RH, Non-Condensing, Mil-Std-810C, Method 507, Procedure I

Vibration: Mil-Std-810C, Method 514.2, Procedure VIII

Mechanical Shock: MIL-STD 810C, Method 516.2 Procedure I.

RUDDER PEDAL COMPONENT (NOTIONAL)



- Will utilize pedals that are used by General Atomics in the Predator system.

- Initially ordering 6 sets of pedals, to make SBPCS workstations Launch and Recovery capable.

- GA not yet under contract to deliver.

RUDDER PEDAL TECHNICAL DATA

No Technical Data Available Yet

TOUCH SCREEN COMPONENT

T210 Flat Panel Terminal

Flat Panel Display, Monochrome Electroluminescent, VT220 Emulation, Built-in Touch Macro Interface, TAC4 Program.

The T210 terminal is lightweight (<6.5 lbs) and yet extremely rugged. The thin profile (2.5 in.) makes it a good choice for new applications and retrofits. The built-in touch interface and software extensions to the emulation can greatly simplify the host application.

TOUCH SCREEN TECHNICAL DATA

Screen Size
- 10.4" Diagonal
- 8.31" x 6.24" Viewing Area

Interface
- A single DB-25 Female Connector For Serial Communications.

Enclosure
- 10.85" (W) x 8.75" (H) x 2.5" (D)
- Material: Machined 6061-T6 painted Aluminum bezel, back cover made from 5052 EPS Aluminum
- Weight: 6.5 lb

Power
- +12 (+/-5%) Volts at 2 Amps

Display Life: 40,000 Hours Approximated

Environmental

Temperature
- Operating: +10C to +50C Mil-Std-810, Method 502, Procedure II

Humidity: 95%RH, Non-Condensing, Mil-Std-810, Method 507, Procedure I

Vibration: Mil-Std-167-1, Type I,

Endurance: 50Hz, 2 Hrs @ 1G

Mechanical Shock: 20G, half Sine, 11 Ms, 3 times per axis, non-operating.

EMI
- Emissions: Mil-Std-461D, RE-102, CE-102, Surface Ship And Submarine
- Susceptibility: RS-103 10 uV/m 14 Khz - 1 Ghz, Mil-Std-461D

MANUAL CONTROL PRELIMINARY DESIGN